

10.4 EXERCISES

HOMEWORK KEY

○ = WORKED-OUT SOLUTIONS
on p. WS1 for Exs. 11, 21, and 45
★ = STANDARDIZED TEST PRACTICE
Exs. 2, 15, 34, 39, 40, 44, and 47

4 PRACTICE AND APPLY

Assignment Guide

Answer Transparencies
available for all exercises

Basic:

Day 1: SRH p. 1004 Exs. 1–9
pp. 710–713
Exs. 1–5, 9–11, 15–22, 26–30,
42–47, 51–63 odd

Average:

Day 1: pp. 710–713
Exs. 1, 2, 5–7, 11–13, 15–17, 22–24,
26, 27, 30–39, 42–49, 52, 56, 62

Advanced:

Day 1: pp. 710–713
Exs. 1, 2, 7, 8, 13–15, 18, 19, 24, 25,
31–50*, 54, 60, 64

Block:

pp. 710–713
Exs. 1, 2, 5–7, 11–13, 15–17, 22–24,
26, 27, 30–39, 42–49, 52, 56, 62
(with 10.3)

Differentiated Instruction

See *Algebra 2 Best Practices Toolkit*
for suggestions on addressing the
needs of a diverse classroom.

Homework Check

For a quick check of student under-
standing of key concepts, go over the
following exercises:

Basic: 4, 10, 16, 42, 43

Average: 6, 12, 17, 42, 44

Advanced: 8, 14, 19, 43, 44

Extra Practice

- Student Edition, p. 1019
- Chapter 10 Resource Book:
Practice levels A, B, C, pp. 41–43

Practice Worksheet

**An easily-readable reduced
practice page (with answers)
for this lesson can be found
on p. 680C.**

SKILL PRACTICE

A

1. **VOCABULARY** Copy and complete: The union or intersection of two events is called a(n) ? . **compound event**

2. **★ WRITING** Are the events A and \bar{A} disjoint? *Explain.* Then give an example of a real-life event and its complement. **Yes; the events in \bar{A} are those events that are not in A .**
Sample answer: Event: You go on a rafting trip. Complement: You do not go on a rafting trip.

EXAMPLE 1

on p. 707
for Exs. 3–8

DISJOINT EVENTS Events A and B are disjoint. Find $P(A \text{ or } B)$.

3. $P(A) = 0.3, P(B) = 0.1$ **0.4** 4. $P(A) = 0.55, P(B) = 0.2$ **0.75** 5. $P(A) = 0.41, P(B) = 0.24$ **0.65**
6. $P(A) = \frac{2}{5}, P(B) = \frac{3}{5}$ **1** 7. $P(A) = \frac{1}{3}, P(B) = \frac{1}{4}$ **$\frac{7}{12}$** 8. $P(A) = \frac{2}{3}, P(B) = \frac{1}{5}$ **$\frac{13}{15}$**

EXAMPLES 2 and 3

on p. 708
for Exs. 9–15

OVERLAPPING EVENTS Find the indicated probability.

9. $P(A) = 0.5, P(B) = 0.35$ 10. $P(A) = 0.6, P(B) = 0.2$ 11. $P(A) = 0.28, P(B) = 0.64$
 $P(A \text{ and } B) = 0.2$ $P(A \text{ or } B) = 0.7$ $P(A \text{ or } B) = 0.71$
 $P(A \text{ or } B) = \underline{?}$ **0.65** $P(A \text{ and } B) = \underline{?}$ **0.1** $P(A \text{ and } B) = \underline{?}$ **0.21**
12. $P(A) = 0.46, P(B) = 0.37$ 13. $P(A) = \frac{2}{7}, P(B) = \frac{4}{7}$ 14. $P(A) = \frac{6}{11}, P(B) = \frac{3}{11}$
 $P(A \text{ and } B) = 0.31$ $P(A \text{ and } B) = \frac{1}{7}$ $P(A \text{ or } B) = \frac{7}{11}$
 $P(A \text{ or } B) = \underline{?}$ **0.52** $P(A \text{ or } B) = \underline{?}$ **$\frac{5}{7}$** $P(A \text{ and } B) = \underline{?}$ **$\frac{2}{11}$**

15. **★ MULTIPLE CHOICE** What is $P(A \text{ or } B)$ if $P(A) = 0.41, P(B) = 0.53$, and $P(A \text{ and } B) = 0.27$? **B**

- (A) 0.12 (B) 0.67 (C) 0.80 (D) 0.94

EXAMPLE 4

on p. 709
for Exs. 16–19

FINDING PROBABILITIES OF COMPLEMENTS Find $P(\bar{A})$.

16. $P(A) = 0.5$ **0.5** 17. $P(A) = 0$ **1** 18. $P(A) = \frac{1}{3}$ **$\frac{2}{3}$** 19. $P(A) = \frac{5}{8}$ **$\frac{3}{8}$**

CHOOSING CARDS A card is randomly selected from a standard deck of 52 cards. Find the probability of drawing the given card.

20. A king *and* a diamond **$\frac{1}{52}$** 21. A king *or* a diamond **$\frac{4}{13}$** 22. A spade *or* a club **$\frac{1}{2}$**
23. A 4 *or* a 5 **$\frac{2}{13}$** 24. A 6 *and* a face card **0** 25. Not a heart **$\frac{3}{4}$**

ERROR ANALYSIS Describe and correct the error in finding the probability of randomly drawing the given card from a standard deck of 52 cards. **26, 27. See margin.**

26.

$$\begin{aligned} P(\text{heart or face card}) &= P(\text{heart}) + P(\text{face card}) \\ &= \frac{13}{52} + \frac{12}{52} \\ &= \frac{25}{52} \end{aligned}$$



27.

$$\begin{aligned} P(\text{club or 9}) &= P(\text{club}) + P(9) + P(\text{club and 9}) \\ &= \frac{13}{52} + \frac{4}{52} + \frac{1}{52} \\ &= \frac{9}{26} \end{aligned}$$



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26. The events overlap, so $\frac{3}{52}$ needs to be subtracted from the probability;

$$P(\text{heart}) + P(\text{face card}) - P(\text{heart and face card}) = \frac{13}{52} + \frac{12}{52} - \frac{3}{52} = \frac{22}{52} \text{ or } \frac{11}{26}$$

27. The probability of a club and 9 must be subtracted instead of added;

$$P(\text{club}) + P(9) - P(\text{club and 9}) = \frac{13}{52} + \frac{4}{52} - \frac{1}{52} = \frac{16}{52} \text{ or } \frac{4}{13}$$

B FINDING PROBABILITIES Find the indicated probability. State whether A and B are disjoint events.

28. $P(A) = 0.25$
 $P(B) = 0.4$
 $P(A \text{ or } B) = 0.50$
 $P(A \text{ and } B) = \frac{?}{?}$
0.15; not disjoint
29. $P(A) = 0.6$
 $P(B) = 0.32$
 $P(A \text{ or } B) = \frac{?}{?}$
 $P(A \text{ and } B) = 0.25$
0.67; not disjoint
30. $P(A) = \frac{?}{?}$
 $P(B) = 0.38$
 $P(A \text{ or } B) = 0.65$
 $P(A \text{ and } B) = 0$
0.27; disjoint
31. $P(A) = \frac{8}{15}$
 $P(B) = \frac{?}{?}$
 $P(A \text{ or } B) = \frac{3}{5}$
 $P(A \text{ and } B) = \frac{2}{15}$
 $\frac{1}{5}$; not disjoint
32. $P(A) = \frac{1}{2}$
 $P(B) = \frac{1}{6}$
 $P(A \text{ or } B) = \frac{2}{3}$
 $P(A \text{ and } B) = \frac{?}{?}$
0; disjoint
33. $P(A) = 16\%$
 $P(B) = \frac{?}{?}$
 $P(A \text{ or } B) = 32\%$
 $P(A \text{ and } B) = 8\%$
24%; not disjoint
34. **★ OPEN-ENDED MATH** Describe a real-life situation that involves two disjoint events A and B . Then describe a real-life situation that involves two overlapping events C and D .

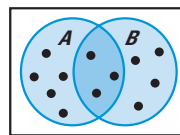
ROLLING DICE Two six-sided dice are rolled. Find the probability of the given event. (Refer to Example 4 on page 709 for the possible outcomes.)

35. The sum is 3 or 4. **$\frac{5}{36}$**
36. The sum is not 7. **$\frac{5}{6}$**
37. The sum is greater than or equal to 5. **$\frac{5}{6}$**
38. The sum is less than 8 or greater than 11. **$\frac{11}{18}$**
39. **★ MULTIPLE CHOICE** Two six-sided dice are rolled. What is the probability that the sum is a prime number? **C**
- (A) $\frac{13}{36}$ (B) $\frac{7}{18}$ (C) $\frac{5}{12}$ (D) $\frac{5}{11}$

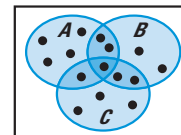
C 40. **★ SHORT RESPONSE** Use the first diagram at the right to explain why this equation is true:

$$P(A) + P(B) = P(A \text{ or } B) + P(A \text{ and } B)$$

See margin.



Ex. 40



Ex. 41

41. **CHALLENGE** Use the second diagram at the right to derive a formula for $P(A \text{ or } B \text{ or } C)$.
 $P(A \text{ or } B \text{ or } C) = P(A) + P(B) + P(C) - P(A \text{ and } B) - P(B \text{ and } C) - P(A \text{ and } C) + P(A \text{ and } B \text{ and } C)$

PROBLEM SOLVING

EXAMPLES **A**
1, 2, and 3
 on pp. 707–708
 for Exs. 42–44

42. **CLASS ELECTIONS** You and your best friend are among several candidates running for class president. You estimate that there is a 45% chance you will win and a 25% chance your best friend will win. What is the probability that either you or your best friend win the election? **70%**

@HomeTutor for problem solving help at classzone.com

43. **BIOLOGY** You are performing an experiment to determine how well plants grow under different light sources. Out of the 30 plants in the experiment, 12 receive visible light, 15 receive ultraviolet light, and 6 receive both visible and ultraviolet light. What is the probability that a plant in the experiment receives either visible light or ultraviolet light? **0.7**

Animated Algebra at classzone.com

Mathematical Reasoning

Multiple Representations

Exercises 9–14, 28–33 Suggest to students that they use both Venn diagrams and the algebraic formula for the probability of compound events to check their answers.



An **Animated Algebra** activity is available on-line for **Exercise 43**. This activity is also available on the **Power Presentations CD-ROM**.

$$40. P(A) + P(B) = \frac{8}{12} + \frac{7}{12} = \frac{15}{12}$$

$$\frac{12}{12} + \frac{3}{12} = P(A \text{ or } B) + P(A \text{ and } B);$$

in $P(A) + P(B)$, the intersection of A and B is counted twice so it has to be added to the probability of $P(A \text{ or } B)$ to make the two sides equal.